

## CLAIMS:

1. A method for use by an Implantable Medical Device (IMD) of filtering a physiological signal having a predetermined frequency bandwidth,

5 the method comprising:

obtaining an analog physiological signal from a sensor coupled to the IMD;

10 filtering the analog physiologic signal with a high pass filter (HPF), the cut-off frequency of the HPF being within the predetermined frequency bandwidth, wherein a low-band portion of the predetermined frequency bandwidth is attenuated in the filtered physiologic signal;

sampling and digitizing the filtered physiologic signal as a digital data set in a real time order;

15 compressing the data set by lossy data compression; and

reverse time order filtering the compressed digital data set in reverse time order employing a digital IIR filter having characteristics substantially matching the cut-off frequency and filter characteristics of the HPF to substantially remove distortions of the filtered analog physiologic signal introduced by the HPF.

20 2. The method of Claim 1, wherein the filtering of the stream of samples with the IIR filter is implemented using programmed instructions.

25 3. The method of Claim 2, wherein the programmed instructions are executed on a processing circuit included within the IMD.

4. The method of Claim 2, wherein the programmed instructions are executed on a processing circuit located external to the IMD.

30 5. The method of Claim 1, wherein the physiologic signal is the cardiac EGM.

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6. The method of Claim 1, further comprising the step of storing  
the reverse time order filtered digital data set in memory of the IMD.

5           7. The method of Claim 1, further comprising the steps of:  
              storing the compressed digital data set in memory of the IMD; and  
              uplink telemetry transmitting the stored compressed digital data set to  
an external medical device (EMD); and  
              wherein the reverse time order filtering step of filtering the compressed digital  
data set in reverse time order employing a digital IIR filter having  
              characteristics substantially matching the cut-off frequency and filter  
              characteristics of the HPF is conducted by the EMD.  
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15           8. A method for use by an Implantable Medical Device (IMD) of  
filtering a physiological signal having a predetermined frequency bandwidth,  
the method comprising:

20           obtaining an analog physiological signal from a sensor coupled to the  
IMD;

25           filtering the analog physiologic signal with a high pass filter (HPF), the  
cut-off frequency of the HPF being within the predetermined frequency  
bandwidth, wherein a low-band portion of the predetermined frequency  
bandwidth is attenuated in the filtered physiologic signal;

30           sampling and digitizing the filtered physiologic signal as a digital data  
set in a time order; and

35           filtering the compressed data set in reverse time order employing a  
digital IIR filter having characteristics substantially matching the cut-off  
frequency and filter characteristics of the HPF to substantially remove  
distortions of the filtered analog physiologic signal introduced by the HPF.

40           9. The method of Claim 8, wherein the filtering of the stream of  
samples with the IIR filter is implemented using programmed instructions.

10. The method of Claim 9, wherein the programmed instructions are executed on a processing circuit included within the IMD.

5 11. The method of Claim 9, wherein the programmed instructions are executed on a processing circuit located external to the IMD.

12. The method of Claim 8, wherein the physiologic signal is the cardiac EGM.

10 13. The method of Claim 8, further comprising the step of storing the reverse time order filtered digital data set in memory of the IMD.

15 14. The method of Claim 8, further comprising the steps of:  
storing the digital data set in memory of the IMD; and  
uplink telemetry transmitting the stored digital data set to an external medical device (EMD); and  
wherein the reverse time order filtering step of filtering the digital data set in reverse time order employing a digital IIR filter having characteristics substantially matching the cut-off frequency and filter characteristics of the HPF is conducted by the EMD.

20 15. Apparatus for use by an Implantable Medical Device (IMD) for filtering a physiological signal having a predetermined frequency bandwidth, the method comprising:

25 a sensor coupled to the IMD for sensing an analog physiological signal;

30 a high pass filter (HPF) for filtering the analog physiologic signal, the HPF having a the cut-off frequency within the predetermined frequency bandwidth, wherein a low-band portion of the predetermined frequency bandwidth is attenuated in the filtered analog physiologic signal;

means for sampling and digitizing the filtered physiologic signal as a digital data set in a real time order;

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means for compressing the data set by lossy data compression; and  
a digital IIR filter having characteristics substantially matching the cut-  
off frequency and filter characteristics of the HPF for reverse time order  
filtering the compressed digital data set to substantially remove distortions of  
the filtered analog physiologic signal introduced by the HPF.

5           16. The apparatus of Claim 15, wherein the filtering of the stream of  
samples with the IIR filter is implemented using programmed instructions.

10           17. The apparatus of Claim 16, wherein the programmed  
instructions are executed on a processing circuit included within the IMD.

15           18. The apparatus of Claim 16, wherein the programmed  
instructions are executed on a processing circuit located external to the IMD.

19. The apparatus of Claim 15, wherein the physiologic signal is the  
cardiac EGM.

20           20. The apparatus of Claim 15, further comprising means for storing  
the reverse time order filtered digital data set in memory of the IMD.

25           21. The apparatus of Claim 15, further comprising:  
means for storing the compressed digital data set in memory of the  
IMD; and

means for uplink telemetry transmitting the stored compressed digital  
data set to an external medical device (EMD); and wherein:

the digital IIR filter having characteristics substantially matching the  
cut-off frequency and filter characteristics of the HPF is within the EMD; and

30           the EMD further comprises means for receiving the uplink telemetry  
transmitted compressed digital data set and applying the received  
compressed digital data set to the digital IIR filter in reverse time order.

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22. Apparatus for use by an Implantable Medical Device (IMD) for filtering a physiological signal having a predetermined frequency bandwidth, the method comprising:

5 a sensor coupled to the IMD for sensing an analog physiological signal;

a high pass filter (HPF) for filtering the analog physiologic signal, the HPF having a the cut-off frequency within the predetermined frequency bandwidth, wherein a low-band portion of the predetermined frequency bandwidth is attenuated in the filtered analog physiologic signal;

10 means for sampling and digitizing the filtered physiologic signal as a digital data set in a real time order; and

15 a digital IIR filter having characteristics substantially matching the cut-off frequency and filter characteristics of the HPF for reverse time order filtering the digital data set to substantially remove distortions of the filtered analog physiologic signal introduced by the HPF.

23. The apparatus of Claim 22, wherein the filtering of the stream of samples with the IIR filter is implemented using programmed instructions.

20 24. The apparatus of Claim 23, wherein the programmed instructions are executed on a processing circuit included within the IMD.

25 25. The apparatus of Claim 23, wherein the programmed instructions are executed on a processing circuit located external to the IMD.

26. The apparatus of Claim 22, wherein the physiologic signal is the cardiac EGM.

30 27. The apparatus of Claim 22, further comprising means for storing the reverse time order filtered digital data set in memory of the IMD.

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28. The apparatus of Claim 22, further comprising:

means for storing the digital data set in memory of the IMD; and

means for uplink telemetry transmitting the stored digital data set to an external medical device (EMD); and wherein:

5 the digital IIR filter having characteristics substantially matching the cut-off frequency and filter characteristics of the HPF is within the EMD; and

the EMD further comprises means for receiving the uplink telemetry transmitted digital data set and applying the received digital data set to the digital IIR filter in reverse time order.

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